

EXHIBIT M

LITHIUMHUB’S INFRINGEMENT ANALYSIS
U.S. Patent No. 9,954,207 – Tracker Lithium Gen2 TLi52-DC
Independent Claims 1 and 12

LithiumHub provides evidence of infringement of independent claims 1 and 12 of U.S. Patent No. 9,954,207 (hereinafter “the ’207 patent”) by Defendant. In support thereof, LithiumHub provides the following claim charts.

“Accused Products” as used herein refers to at least Tracker Lithium Gen2 TLi52-DC and the Accused Products enumerated in the Complaint. These claim charts demonstrate Defendant’s infringement by comparing each element of the asserted claims to corresponding components, aspects, and/or features of the Accused Products. These claim charts are not intended to constitute an expert report on infringement. These claim charts include information provided by way of example, and not by way of limitation.

Unless otherwise noted, LithiumHub contends that Defendant indirectly infringes the ’207 patent in violation of 35 U.S.C. § 271(a) by inducing others to sell, offer to sell, make, use, and/or import the Accused Products. The following exemplary analysis demonstrates that infringement. Unless otherwise noted, LithiumHub further contends that the evidence below supports a finding of indirect infringement under 35 U.S.C. §§ 271(b) and/or (c), in conjunction with other evidence of liability under one or more of those subsections. Defendant makes, uses, sells, imports, or offers for sale in the United States, or has made, used, sold, imported, or offered for sale in the past, without authority, or induces others to make, use, sell, import, or offer for sale in the United States, or has induced others to make, use, sell, import, or offer for sale in the past, without authority products, equipment, or services that infringe claims 1 and 12 of the ’207 patent, including without limitation, the Accused Products.


Unless otherwise noted, LithiumHub believes and contends that each element of each claim asserted herein is literally met by the Accused Products. However, to the extent that Defendant attempts to allege that any asserted claim element is not literally met, LithiumHub believes and contends that such elements are met under the doctrine of equivalents. More specifically, in its investigation and analysis of the Accused Products, LithiumHub did not identify any substantial differences between the elements of the patent claims and the corresponding features of the Accused Products, as set forth herein. In each instance, the identified feature of the Accused Products performs at least substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim element.

To the extent the chart of an asserted claim relies on evidence about certain specifically identified Accused Products, LithiumHub asserts that, on information and belief, any similarly functioning Accused Product also infringes the charted claim. LithiumHub reserves the right to amend this infringement analysis based on other products made, used, sold, imported, or offered for sale by Defendant or its customers. LithiumHub further reserves the right to amend this infringement analysis by adding, subtracting, or otherwise modifying content in the “Accused Products” column of each chart.

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
Claim 1	
<p>[1p]</p> <p>A battery pack having positive and negative terminals for powering an electric motor for starting an internal combustion engine in which the electric motor is in a 6 volt to 48 volt operating system, said battery pack comprising:</p>	<p>To the extent the preamble is limiting, the Tracker Lithium Gen2 12.8V 52AH is a battery pack having positive (10) and negative terminals (11).</p>  <p>To the extent the preamble is limiting, the Tracker Lithium Gen2 12.8V 52AH may be used for powering an electric motor for starting an internal combustion engine in which the electric motor is in a 6 volt to 48 volt operating system.</p>

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)



TRACKER LITHIUM Gen 2

FREQUENTLY ASKED QUESTIONS

SIZING/SELECTION

Q: Will Tracker Lithium batteries work with my Trolling motor?
Tracker Lithium deep-cycle batteries 52A and greater are designed to work with all production Trolling Motors. Please consult your specification sheet for larger current drains.

Q: What is the minimum quantity of batteries needed for my trolling motor or boat motor?

• 12V trolling motor	1 battery
• 24V trolling motor	2 batteries
• 36V trolling motor	3 batteries
• 12V Starting Battery	1 battery

Q: Do I need to use the Lithium Starting battery if I purchase Lithium deep-cycle batteries?
No, but we recommend the Tracker Lithium starting batteries for extended accessory runtime and faster charging than lead batteries.

Q: Can I use different types (Flooded, AGM, Lithium) batteries in my boat for Deep-Cycle applications?
Yes, if there is a defective lithium unit, then adding a Flooded or AGM battery short-term in the battery bank will not cause any damage to either setup, but you cannot mix Lithium and Lead in series connections for long-term use. Also, ensure you use the same SKU battery per bank.

Q: Can I use different types (Flooded, AGM, Lithium) batteries in starting applications.
Yes, adding a flooded or AGM (Lead) battery in parallel can protect the lithium battery and boat components from momentary/defective peak alternator current & voltage.

*Please note: The lead battery should connect to the lithium battery in parallel as a stand-alone battery. Then, install the lithium battery as the main battery with all wires, charger, alternator, starter, etc.... connected to the lithium battery terminals.
(See series and parallel diagram on page 2)*

Q: Are my Tracker Lithium batteries drop-in replacements?
Yes, Tracker Lithium batteries have physically similar dimensions as Lead and AGM.

Deep-Cycle options: The 52A battery is in the U1 size (riding lawnmower size). The 60, 80, and 100 options are all group 24.
Starting: The 100A starting battering is a group 31.

INSTALLATION

Q: How should I install my Tracker Lithium batteries?
The battery is a direct replacement and should be installed the same as the existing batteries.

INSTALLATION (cont'd)

Q: What size cables/wiring do I need to connect the Tracker Lithium batteries?
Refer to the Original Equipment Manufacturer's specifications for wire size required to operate your electrical components and motors.

CHARGING

Q: What charger do you recommend for marine applications?
We recommend using a multi-bank charger to ensure each battery is balanced correctly and receives a full charge. Chargers with a lithium charge profile are required; Lead battery chargers may charge the lithium battery, but doing so will harm the lithium cells lifespan. Please consult your Tracker Lithium dealer for approved lithium charger models.

Dual Pro and Noco Charging brands with lithium settings are the approved options for Tracker Lithium. There are there brands that state they can "charge" lithium, but there could be functionality concerns, such as not having to the ability to charge a battery that's 100% discharged. We will update this list with additional chargers as they become available.

Q: Can I use any charge profile to charge my batteries?
No. AGM or Lead charging profiles can charge a lithium battery which is not fully depleted, but it will harm lithium cells and reduce the battery's overall lifespan.

Lithium chargers use algorithms that properly balance and charge the lithium cells.

Q: Can I charge multiple batteries in series or parallel with a single set of charge leads (single-bank charger)?
Yes, but each battery must receive a full charge independently before connecting in series or parallel. It is strongly recommended to use a multi-bank charger to ensure proper charging and wake-up functions.

Q: How long does it take for the batteries to be fully charged?
The charging time for your batteries depends on the following: the percent discharged, the charger's output current (Amps), and the total capacity of your battery. Typically, a 10A charger will fully charge a depleted 100A battery in 10 hours.

Q: Do I need to charge my Tracker Lithium batteries after each use?
It is recommended to fully charge your batteries after each use to ensure full capacity for subsequent uses. Storing lithium batteries under 20% charged can damage the cells or BMS which reduces their overall lifespan.

https://assets.basspro.com/image/upload/v1681327624/PDFs/other/other_Tracker_Lithium_Gen2_FAQ_Sheet.pdf
(annotated).

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
[1a] a battery pack housing;	The Tracker Lithium Gen2 12.8V 52AH includes a battery pack housing (1).

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[1b] at least one lithium-based rechargeable cell within said housing; and</p>	<p>The Tracker Lithium Gen2 12.8V 52AH includes at least one lithium-based rechargeable cell (e.g., 7) within the housing.</p>

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)


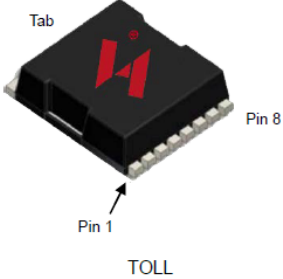
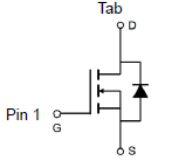


US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[1c-i] a solid state switching apparatus comprising a plurality of pairs of solid state switches with one pair of solid</p>	<p>The Tracker Lithium Gen2 12.8V 52AH includes a solid state switching apparatus.</p>

US9,954,207 Claim Element

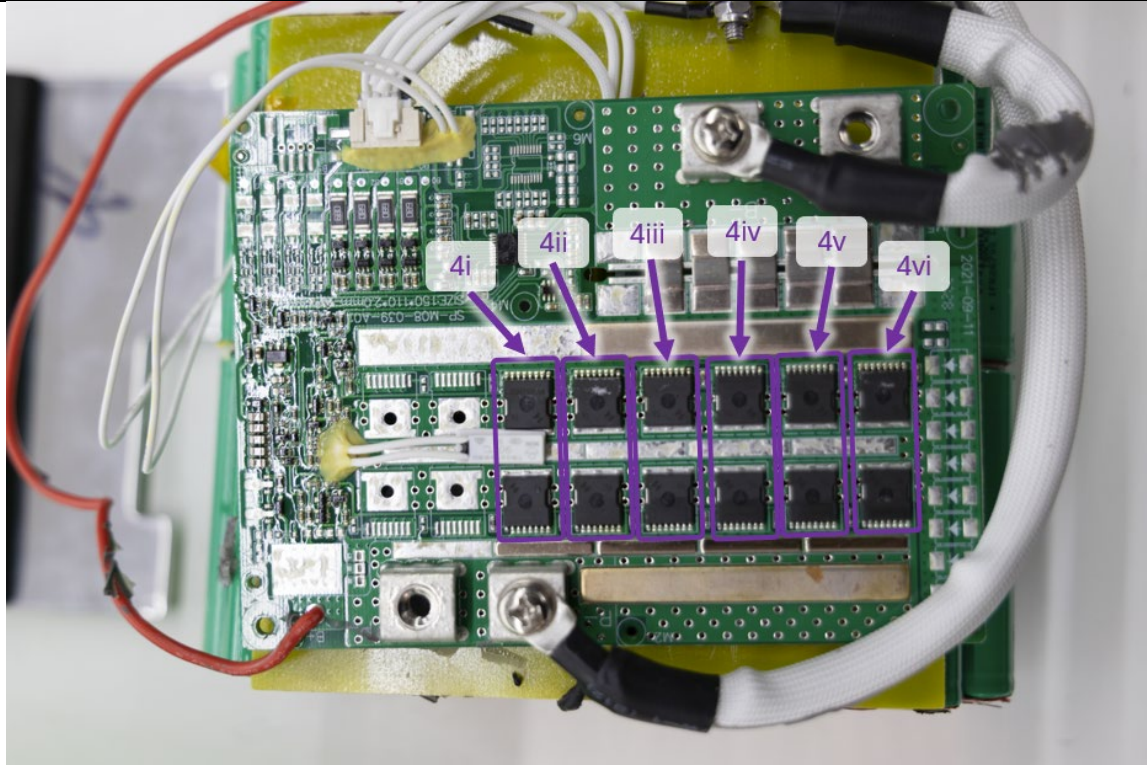
state switches connected in a parallel configuration to another pair of solid state switches,

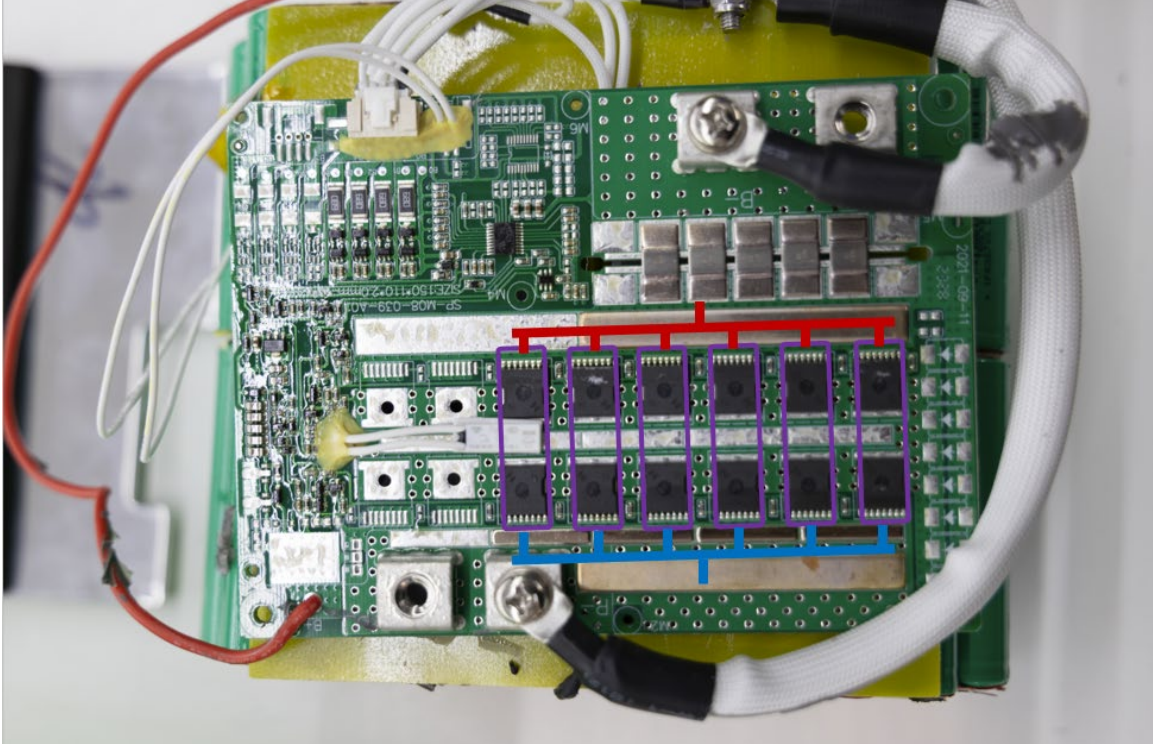
Tracker (Tracker Lithium Gen2 12.8V 52AH)


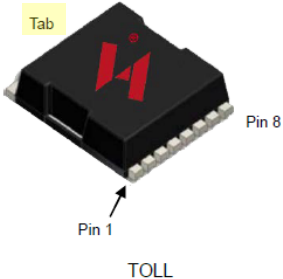
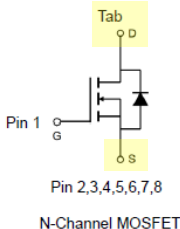
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div> <div> <div>HYG015N10NS1TA</div> <div>  HUAYI Microelectronics </div> </div> <div> <div>N-Channel Enhancement Mode MOSFET</div> </div> <div> Feature <ul style="list-style-type: none"> • 100V/380A $R_{DS(on)} = 1.2 \text{ m}\Omega (\text{typ.}) @ V_{GS} = 10\text{V}$ • 100% Avalanche Tested • Reliable and Rugged • Halogen-Free Devices Available (RoHS Compliant) </div> <div> Pin Description  </div> <div> Applications <ul style="list-style-type: none"> • Switching application • Power management for inverter systems • Battery management </div> <div>  <p>Pin 2,3,4,5,6,7,8 N-Channel MOSFET</p> </div> </div>
	<p>Huayi-HYG015N10NS1TA datasheet.pdf (annotated).</p> <p>The Tracker Lithium Gen2 12.8V 52AH comprises a plurality of pairs of solid state switches (e.g., 4i-4vi) with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches.</p>

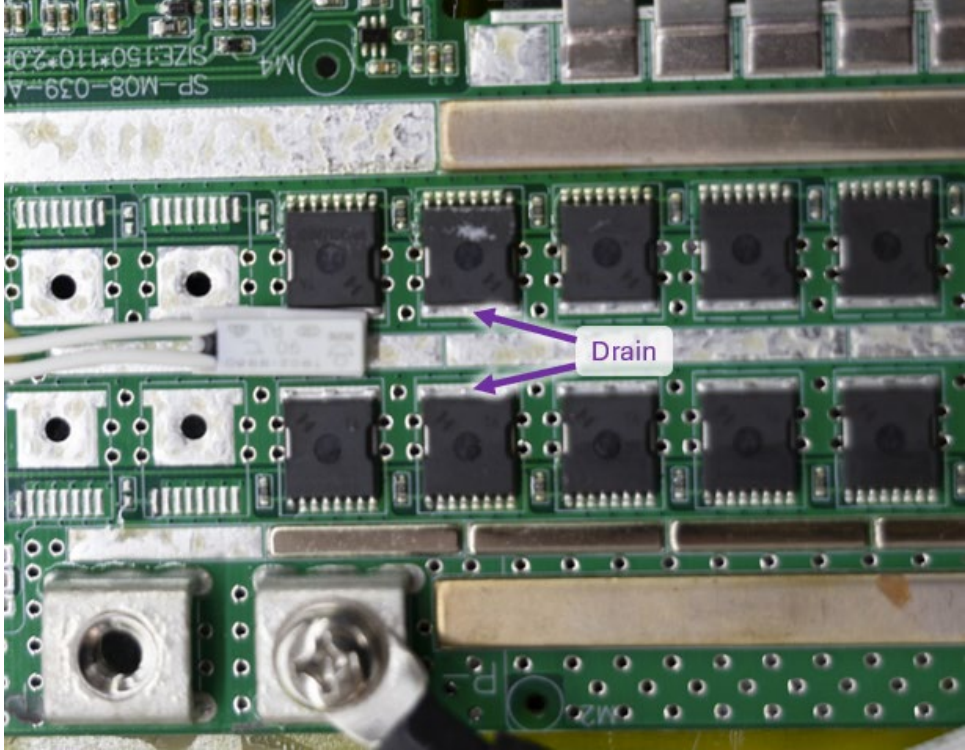
US9,954,207 Claim Element

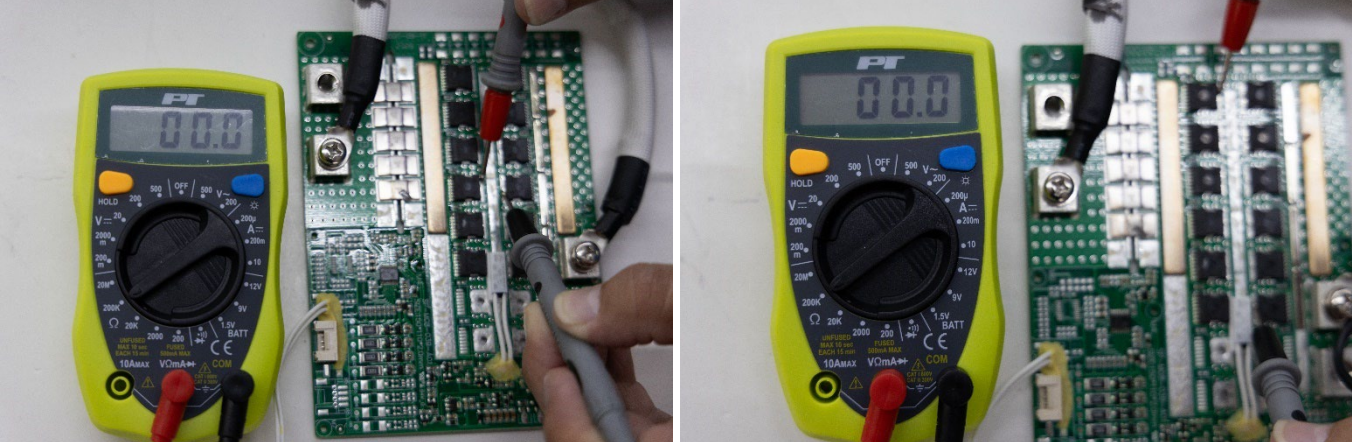
Tracker (Tracker Lithium Gen2 12.8V 52AH)



US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[1c-ii] each switch having a source and a drain, the switches of a pair of solid state switches being configured such that either the drains of the switches are connected or the sources of the switches are connected, and</p>	<p>Each switch of the Tracker Lithium Gen2 12.8V 52AH has a source (i.e., “S”) and a drain (i.e., “D”).</p>

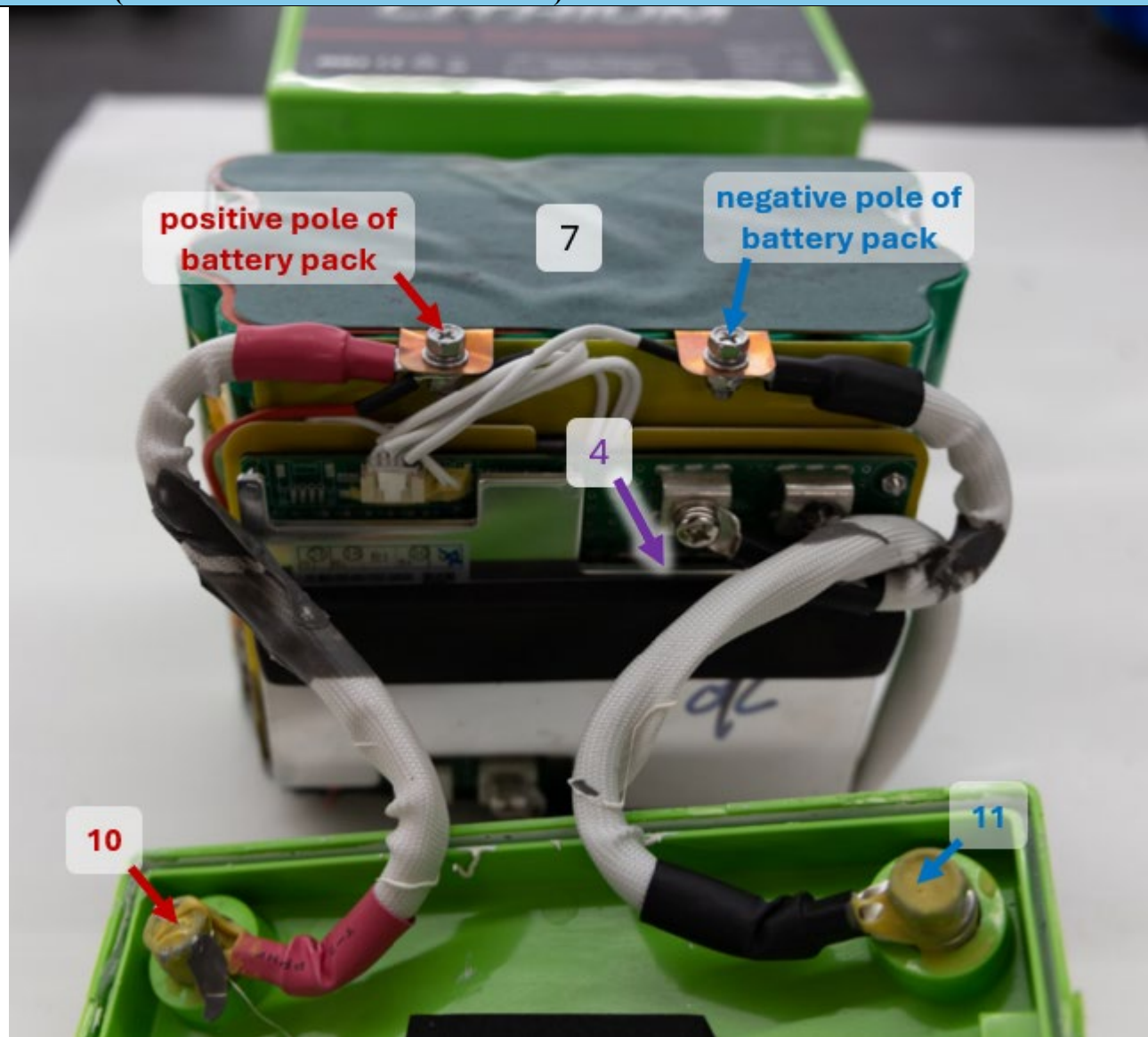
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div> <div> <div>HYG015N10NS1TA</div> <div>  HUAYI Microelectronics </div> </div> <div> <div>N-Channel Enhancement Mode MOSFET</div> </div> <div> Feature <ul style="list-style-type: none"> • 100V/380A $R_{DS(on)}=1.2\text{ m}\Omega(\text{typ.})@V_{GS}=10\text{V}$ • 100% Avalanche Tested • Reliable and Rugged • Halogen-Free Devices Available (RoHS Compliant) </div> <div> Pin Description  </div> <div> Applications <ul style="list-style-type: none"> • Switching application • Power management for inverter systems • Battery management </div> <div>  </div> </div>
	<p>Huayi-HYG015N10NS1TA datasheet.pdf (annotated).</p> <p>The switches of a pair of solid state switches of the Tracker Lithium Gen2 12.8V 52AH are configured such that the drains of the switches are connected.</p>

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div></div> <p>For example, as demonstrated by testing the electrical continuity using a multimeter, the drains of the switches of the Tracker Lithium Gen2 12.8V 52AH are connected, as shown by the nominal resistance measured between the drains of opposed MOSFETs.</p>

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[1c-iii] said parallel configuration being connected with one or more cells between the positive and negative terminals,</p>	<p>The parallel configuration of solid state switches (4) of the Tracker Lithium Gen2 12.8V 52AH are connected with one or more cells (7) between the positive (10) and negative terminals (11).</p>

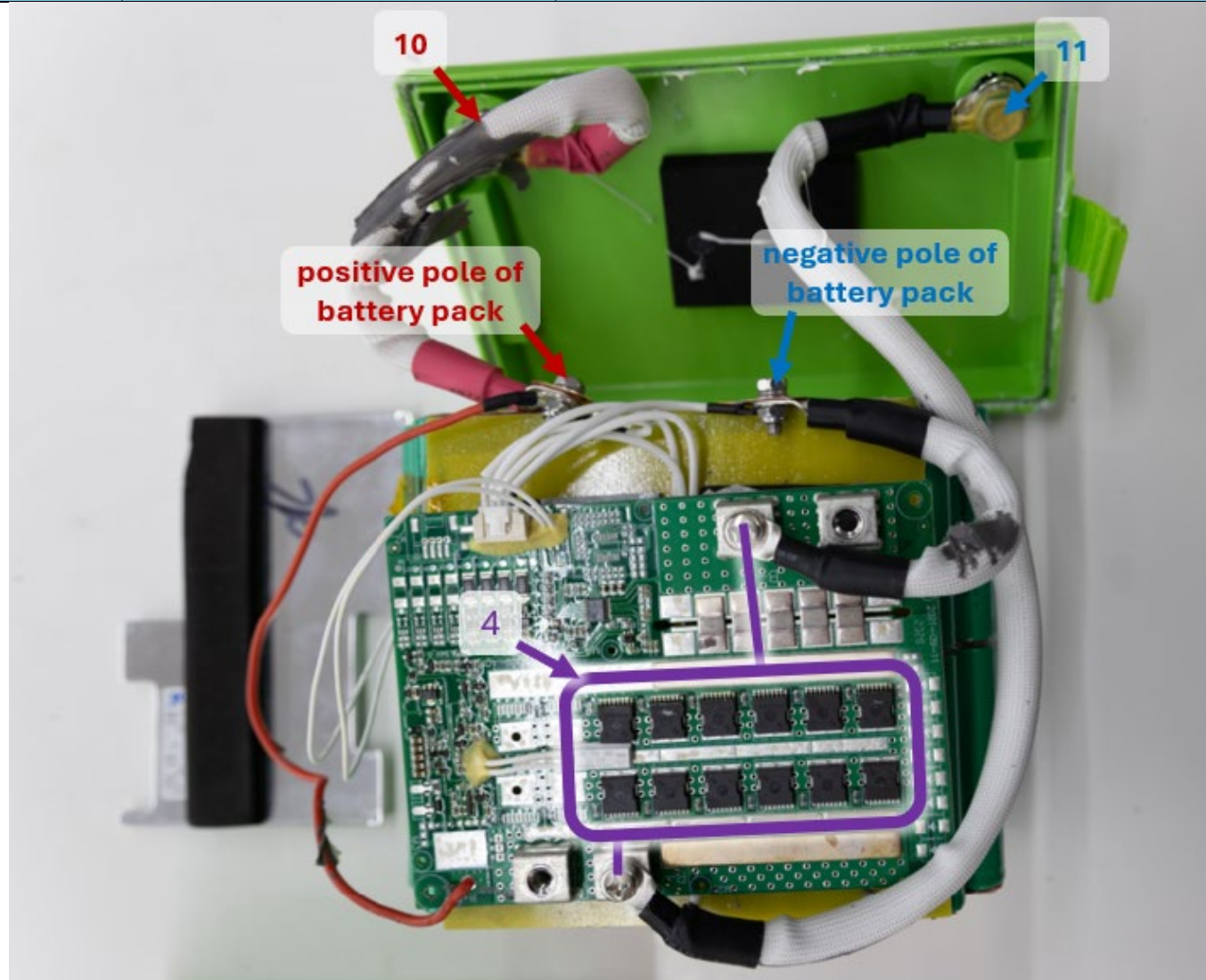
US9,954,207 Claim Element

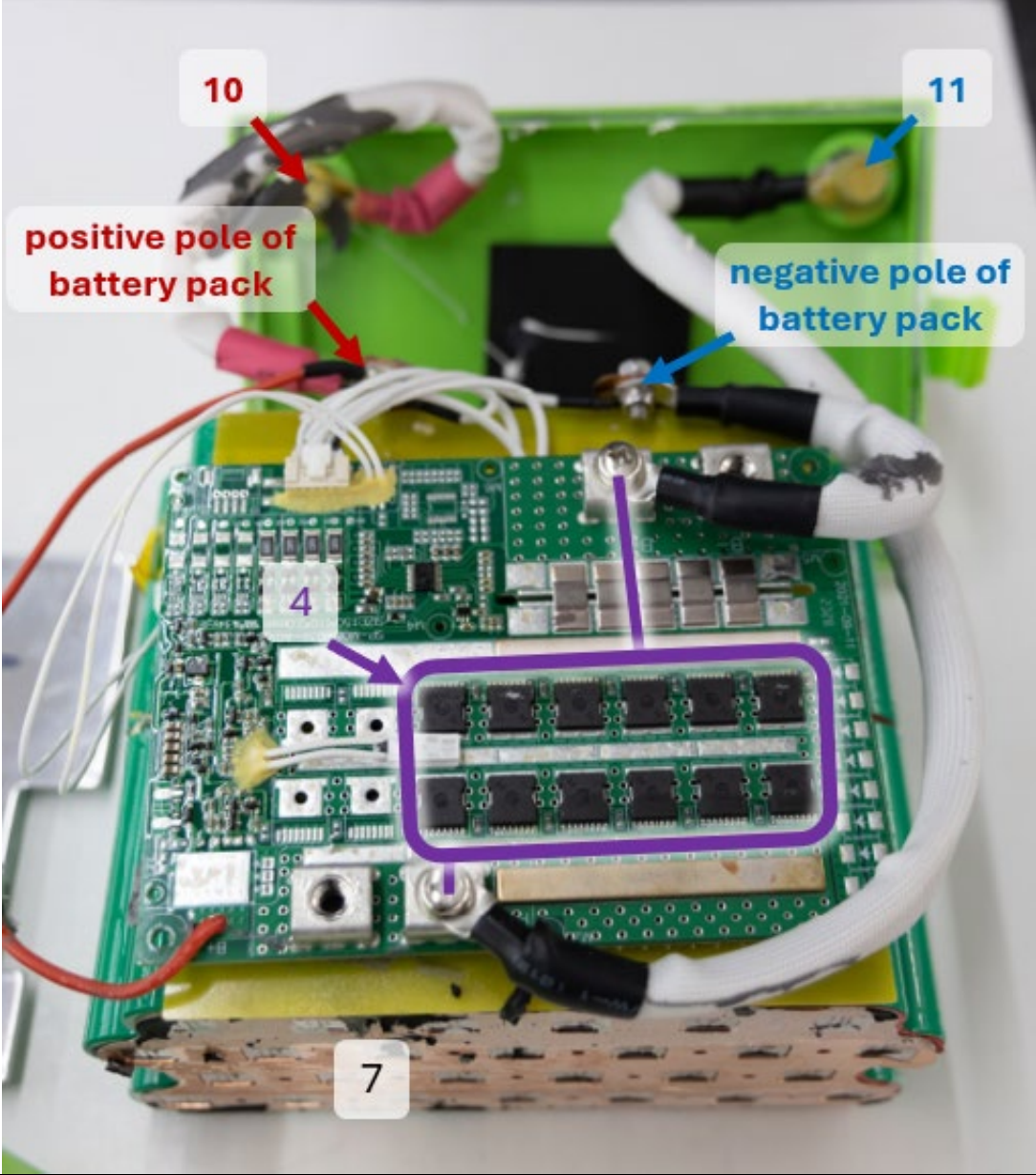
Tracker (Tracker Lithium Gen2 12.8V 52AH)




US9,954,207 Claim Element


Tracker (Tracker Lithium Gen2 12.8V 52AH)




US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
[1d]	The total discharging amount of each lithium-based cell in the Tracker Lithium Gen2 12.8V 52AH is from 3 Ah to 2000 Ah (e.g, 4.0Ah), and the charging voltage per one cell is from 2.0 to 4.2 V (e.g., 3.2V).

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
<p>wherein a total discharging amount of each lithium-based cell in the battery pack is from 3 Ah to 2000 Ah, and charging voltage per one cell is 2.0 to 4.2 V.</p>	
Claim 12	
<p>[12p] A deep cycle battery having positive and negative terminals in a 6 volt to 800 volt operating system, comprising:</p>	<p>To the extent the preamble is limiting, the Tracker Lithium Gen2 12.8V 52AH is a deep cycle battery having positive (10) and negative terminals (11) in a 6 volt to 800 volt operating system.</p>

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	 <p>The image displays two views of the Tracker Lithium Gen2 12.8V 52AH battery. The left view shows the front of the battery, which is green and black. A red box highlights the '12.8V 52AH' label (labeled 10). A red '+' terminal is also highlighted (labeled 10). A blue box highlights the '-' terminal (labeled 11). The right view shows the back of the battery, which is green and black. The label on the back reads 'Gen2: 12.8V 52AH' and 'TRACKER LITHIUM'.</p>

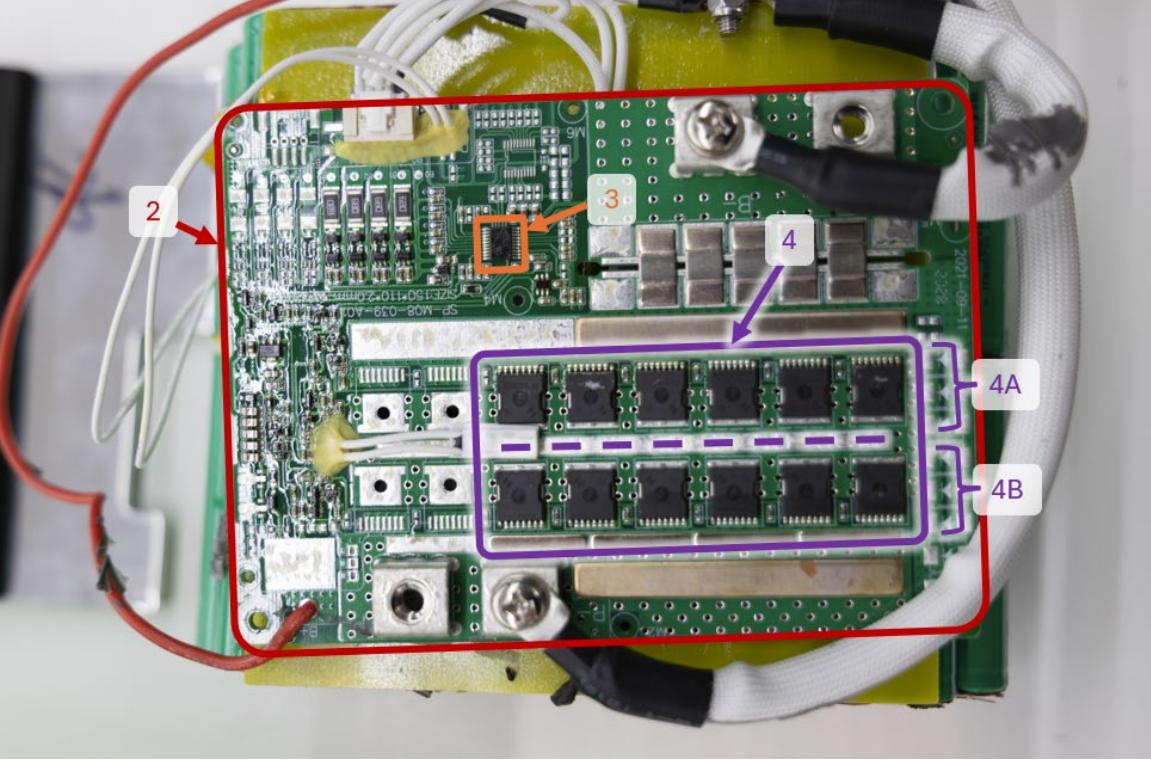
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)								
	<div>  <p>TRACKER LITHIUM Gen 2</p> <p>FREQUENTLY ASKED QUESTIONS</p> </div> <div> <p>SIZING/SELECTION</p> </div> <div> <p>Q: Will Tracker Lithium batteries work with my Trolling motor? Tracker Lithium deep-cycle batteries 52A and greater are designed to work with all production Trolling Motors. Please consult your specification sheet for larger current drains.</p> </div> <div> <p>Q: What is the minimum quantity of batteries needed for my trolling motor or boat motor?</p> <table border="0"> <tr> <td>• 12V trolling motor</td> <td>1 battery</td> </tr> <tr> <td>• 24V trolling motor</td> <td>2 batteries</td> </tr> <tr> <td>• 36V trolling motor</td> <td>3 batteries</td> </tr> <tr> <td>• 12V Starting Battery</td> <td>1 battery</td> </tr> </table> </div> <div> <p>Q: Do I need to use the Lithium Starting battery if I purchase Lithium deep-cycle batteries? No, but we recommend the Tracker Lithium starting batteries for extended accessory runtime and faster charging than lead batteries.</p> </div> <div> <p>Q: Can I use different types (Flooded, AGM, Lithium) batteries in my boat for Deep-Cycle applications? Yes, if there is a defective lithium unit, then adding a Flooded or AGM battery short-term in the battery bank will not cause any damage to either setup, but you cannot mix Lithium and Lead in series connections for long-term use. Also, ensure you use the same SKU battery per bank.</p> </div> <div> <p>Q: Can I use different types (Flooded, AGM, Lithium) batteries in starting applications. Yes, adding a flooded or AGM (Lead) battery in parallel can protect the lithium battery and boat components from momentary/defective peak alternator current & voltage.</p> </div> <div> <p><i>Please note: The lead battery should connect to the lithium battery in parallel as a stand-alone battery. Then, install the lithium battery as the main battery with all wires, charger, alternator, starter, etc.... connected to the lithium battery terminals. (See series and parallel diagram on page 2)</i></p> </div> <div> <p>Q: Are my Tracker Lithium batteries drop-in replacements? Yes, Tracker Lithium batteries have physically similar dimensions as Lead and AGM.</p> </div> <div> <p>Deep-Cycle options: The 52A battery is in the U1 size (riding lawnmower size). The 60, 80, and 100 options are all group 24. Starting: The 100A starting battering is a group 31.</p> </div> <div> <p>INSTALLATION</p> </div> <div> <p>Q: How should I install my Tracker Lithium batteries? The battery is a direct replacement and should be installed the same as the existing batteries.</p> </div> <div> <p>INSTALLATION (cont'd)</p> </div> <div> <p>Q: What size cables/wiring do I need to connect the Tracker Lithium batteries? Refer to the Original Equipment Manufacturer's specifications for wire size required to operate your electrical components and motors.</p> </div> <div> <p>CHARGING</p> </div> <div> <p>Q: What charger do you recommend for marine applications? We recommend using a multi-bank charger to ensure each battery is balanced correctly and receives a full charge. Chargers with a lithium charge profile are required; Lead battery chargers may charge the lithium battery, but doing so will harm the lithium cells lifespan. Please consult your Tracker Lithium dealer for approved lithium charger models.</p> </div> <div> <p>Dual Pro and Noco Charging brands with lithium settings are the approved options for Tracker Lithium. There are there brands that state they can "charge" lithium, but there could be functionality concerns, such as not having to the ability to charge a battery that's 100% discharged. We will update this list with additional chargers as they become available.</p> </div> <div> <p>Q: Can I use any charge profile to charge my batteries? No. AGM or Lead charging profiles can charge a lithium battery which is not fully depleted, but it will harm lithium cells and reduce the battery's overall lifespan.</p> </div> <div> <p>Lithium chargers use algorithms that properly balance and charge the lithium cells.</p> </div> <div> <p>Q: Can I charge multiple batteries in series or parallel with a single set of charge leads (single-bank charger)? Yes, but each battery must receive a full charge independently before connecting in series or parallel. It is strongly recommended to use a multi-bank charger to ensure proper charging and wake-up functions.</p> </div> <div> <p>Q: How long does it take for the batteries to be fully charged? The charging time for your batteries depends on the following: the percent discharged, the charger's output current (Amps), and the total capacity of your battery. Typically, a 10A charger will fully charge a depleted 100A battery in 10 hours.</p> </div> <div> <p>Q: Do I need to charge my Tracker Lithium batteries after each use? It is recommended to fully charge your batteries after each use to ensure full capacity for subsequent uses. Storing lithium batteries under 20% charged can damage the cells or BMS which reduces their overall lifespan.</p> </div> <p>https://assets.basspro.com/image/upload/v1681327624/PDFs/other/other_Tracker_Lithium_Gen2_FAQ_Sheet.pdf (annotated).</p>	• 12V trolling motor	1 battery	• 24V trolling motor	2 batteries	• 36V trolling motor	3 batteries	• 12V Starting Battery	1 battery
• 12V trolling motor	1 battery								
• 24V trolling motor	2 batteries								
• 36V trolling motor	3 batteries								
• 12V Starting Battery	1 battery								
[12a] a battery pack housing;	The Tracker Lithium Gen2 12.8V 52AH includes a battery pack housing.								

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
[12b] at least one lithium-based rechargeable cell within said housing;	The Tracker Lithium Gen2 12.8V 52AH includes at least one lithium-based rechargeable cell (e.g., 7) within said housing.

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	 <p>The image consists of two photographs of the Tracker Lithium Gen2 12.8V 52AH battery. The left photograph shows the battery in its green carrying case, which is open, revealing the battery unit and a black protective bag. The right photograph shows the battery unit with its green carrying case partially visible. A callout '7' with an arrow points to the side of the battery unit, specifically to the side of the cell stack. The battery unit is labeled 'Tracker Lithium Gen2: 12.8V 52AH' and 'SUPER HIGH OUTPUT LITHIUM DEEP CYCLE BATTERY'. It also features the 'LiFePO4' logo and various safety and performance specifications.</p>

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[12c] a battery management system including a processor and a circuit board which protects from one of overvoltage, undervoltage, reverse polarity,</p>	<p>The Tracker Lithium Gen2 12.8V 52AH includes a battery management system including a processor (3) and a circuit board (2).</p>

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
short circuit, and extremes of temperature;	 <p>The Tracker Lithium Gen2 12.8V 52AH protects from one of overvoltage, undervoltage, reverse polarity, short circuit, and extremes of temperature. For example, the Tracker Lithium Gen2 12.8V 52AH includes thermal protection sensors (6) to protect against operation during extreme temperature conditions.</p>

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)



TLi/WR52-DC Gen2

ELECTRICAL SPECIFICATIONS

Nominal Voltage	12.8V
Nominal Capacity	52Ah
Capacity @ 25A	156 min
Resistance	≤30 mΩ @ 50% SOC
Efficiency	99%
Self Discharge	<3% per Month
Maximum Modules in Series	4

DISCHARGE SPECIFICATIONS

Maximum Continuous Discharge Current	60A
Peak Discharge Current	200A (2s)
BMS Discharge Current Cut-Off	200A ± 50A (2 ± 1 ms)
Recommended Low Voltage Disconnect	10V
BMS Discharge Voltage Cut-Off	9.2V (2.3 ± 0.1 vpc) (2 ± 0.5s)
Reconnect Voltage	10V (2.5 ± 0.1 vpc) (2 ± 0.5s)
Short Circuit Protection	200-800 μA

TEMPERATURE SPECIFICATIONS

Discharge Temperature	-4 to 140 °F (-20 to 60 °C)
Charge Temperature	-4 to 113 °F (-20 to 45 °C)
BMS High Temperature Cut-Off	167 °F (75 °C)
Reconnect Temperature	122 °F (50 °C)

MECHANICAL SPECIFICATIONS

Dimensions (L x W x H)	7.75 X 5.27 X 6.69" 197 X 134 X 170 MM
Weight	15.7 lbs (7.1 kg)
Terminal Type	M8 x 1.25 x 2mm
Terminal Torque	80 - 100 in-lbs (9 - 11 N-m)
Case Material	ABS
Enclosure Protection	IP67
Cell Type - Chemistry	Cylindrical - LiFePO4

CHARGE SPECIFICATIONS

Recommended Charge Current	10A
Maximum Charge Current	50A
Charge Current 14 to 32 °F (-10 to 0 °C)	≤0.03 C
Charge Current -4 to 14 °F (-20 to -10 °C)	≤0.02 C
Recommended Charge Voltage	14.2 V - 14.6 V
BMS Charge Voltage Cut-Off	15V (3.75 ± 0.05 vpc) (1.5 ± 1.0 s)
Reconnect Voltage	14.4V (3.6 ± 0.05 vpc)
Balancing Voltage	14.2V (3.55 ± 0.05 vpc)

COMPLIANCE SPECIFICATIONS

Certifications	UN 38.3 & CE (BATTERY) UL1642 (CELLS) (FILE# MH64443) IEC62133 (CELLS)
Shipping Classification	UN 3480, CLASS 9

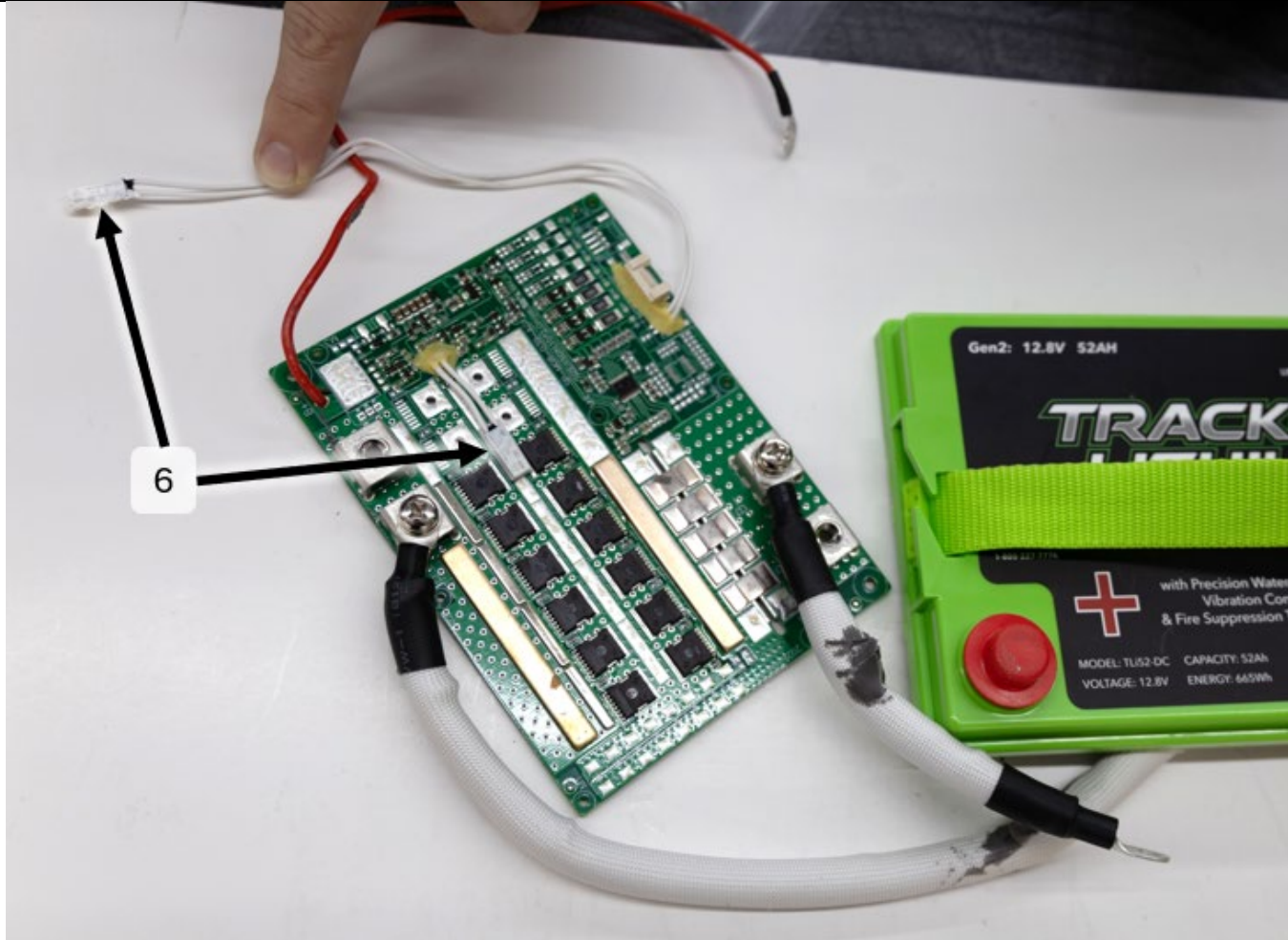
DIMENSIONAL SPECIFICATIONS


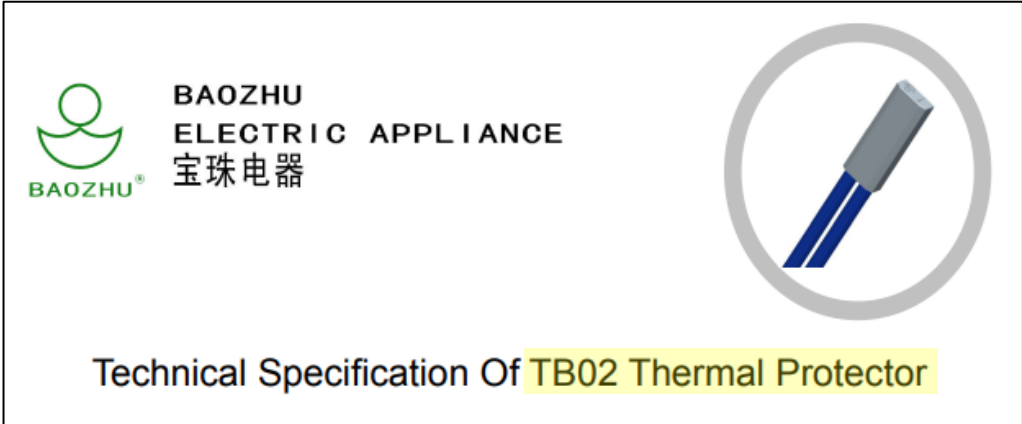


https://assets.basspro.com/image/upload/v1684850673/PDFs/other/other_Tracker_Lithium_Gen2_Spec_Sheet.pdf
(annotated).

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)



US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div>  </div> <p>Tracker Lithium Gen2 12.8V 52AH.</p> <div>  </div> <p>Baozhu-TB02-BB8D Datasheet.pdf (annotated).</p> <p>Also, for example, as demonstrated by connecting the battery terminals of the Tracker Lithium Gen2 12.8V 52AH to a computerized battery analyzer (<i>see</i> photo A below), the protection circuitry is demonstrated for an undervoltage condition by the termination of electrical current when the Tracker Lithium Gen2 12.8V 52AH was discharged below its rated voltage (<i>see</i> photo B below). Similarly, the protection circuitry is demonstrated for an overvoltage condition by the termination of electrical current when the Tracker Lithium Gen2 12.8V 52AH was charged above its rated voltage (<i>see</i> photo C below).</p>

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)

A



US9,954,207 Claim Element


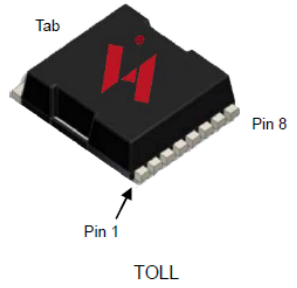
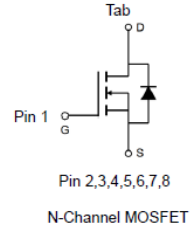
Tracker (Tracker Lithium Gen2 12.8V 52AH)



[12d-i]

The Tracker Lithium Gen2 12.8V 52AH includes a solid state switching apparatus.

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
<p>wherein said circuit board comprises a solid state switching apparatus comprising a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches,</p>	

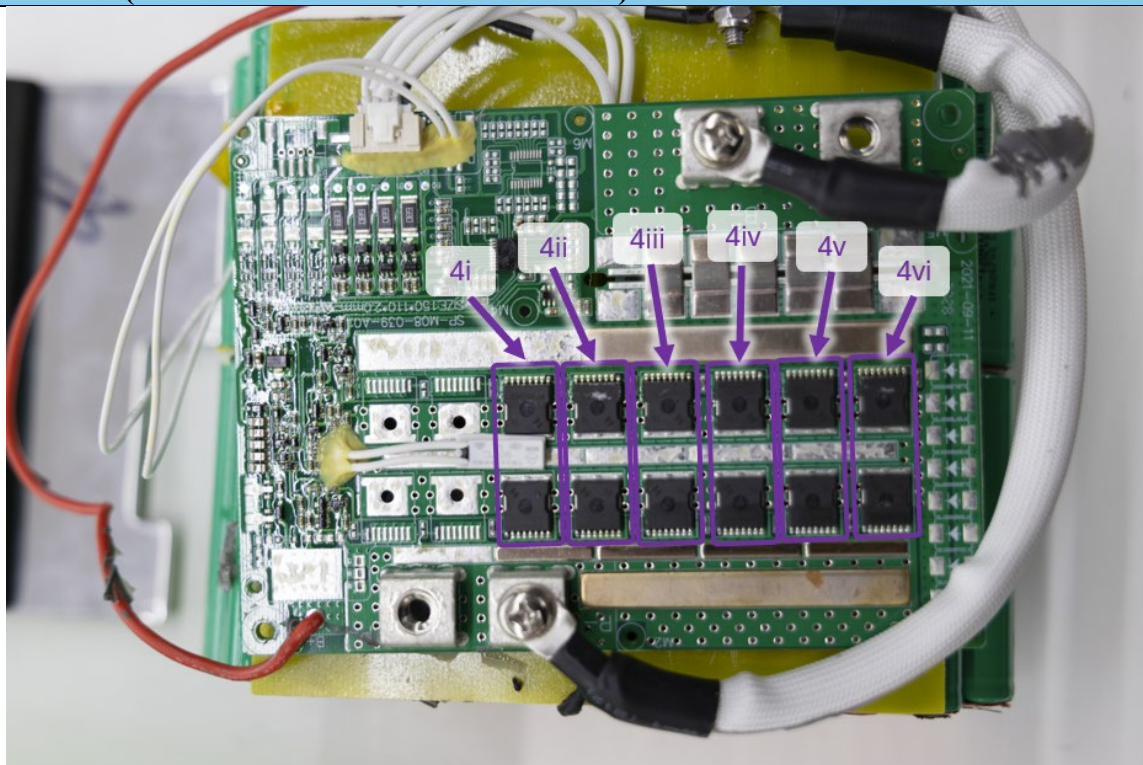
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div> <div>HYG015N10NS1TA</div> <div>  HUAYI Microelectronics </div> <div>N-Channel Enhancement Mode MOSFET</div> <div>Feature</div> <ul style="list-style-type: none"> • 100V/380A $R_{DS(on)} = 1.2 \text{ m}\Omega (\text{typ.}) @ V_{GS} = 10\text{V}$ • 100% Avalanche Tested • Reliable and Rugged • Halogen-Free Devices Available (RoHS Compliant) <div>Pin Description</div> <div>  </div> <div>Applications</div> <ul style="list-style-type: none"> • Switching application • Power management for inverter systems • Battery management <div>  </div> </div>

Huayi-HYG015N10NS1TA datasheet.pdf (annotated).


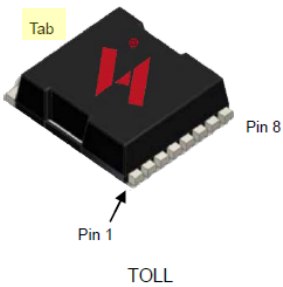
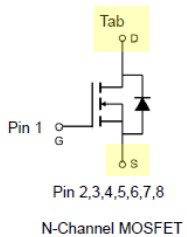
The Tracker Lithium Gen2 12.8V 52AH comprises a plurality of pairs of solid state switches with one pair of solid state switches connected in a parallel configuration to another pair of solid state switches.

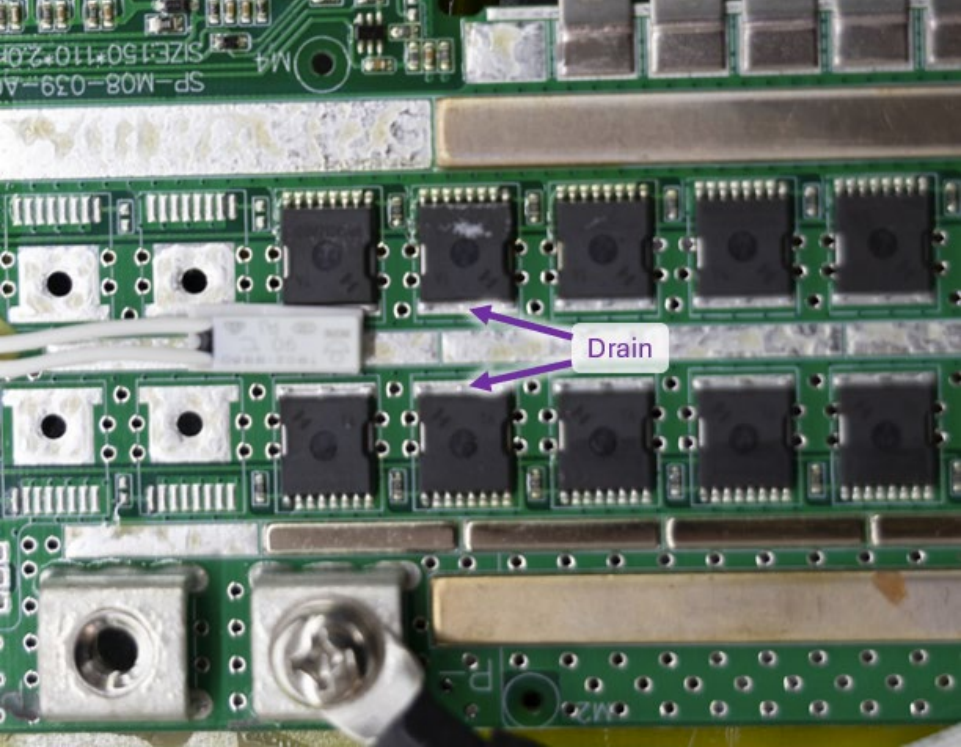
US9,954,207 Claim Element

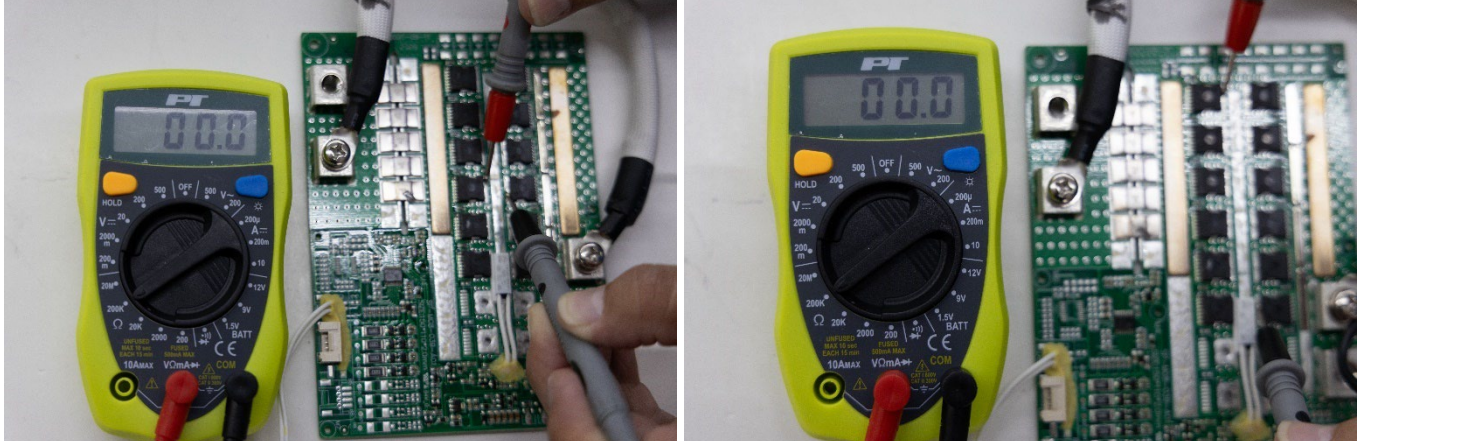
Tracker (Tracker Lithium Gen2 12.8V 52AH)



US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
<p>[12d-ii] each switch having a source and a drain, the switches of a pair of solid state switches being configured such that either the drains of the switches are connected or the sources of the switches are connected, and</p>	<p>Each switch of the Tracker Lithium Gen2 12.8V 52AH has a source (i.e., “S”) and a drain (i.e., “D”).</p>

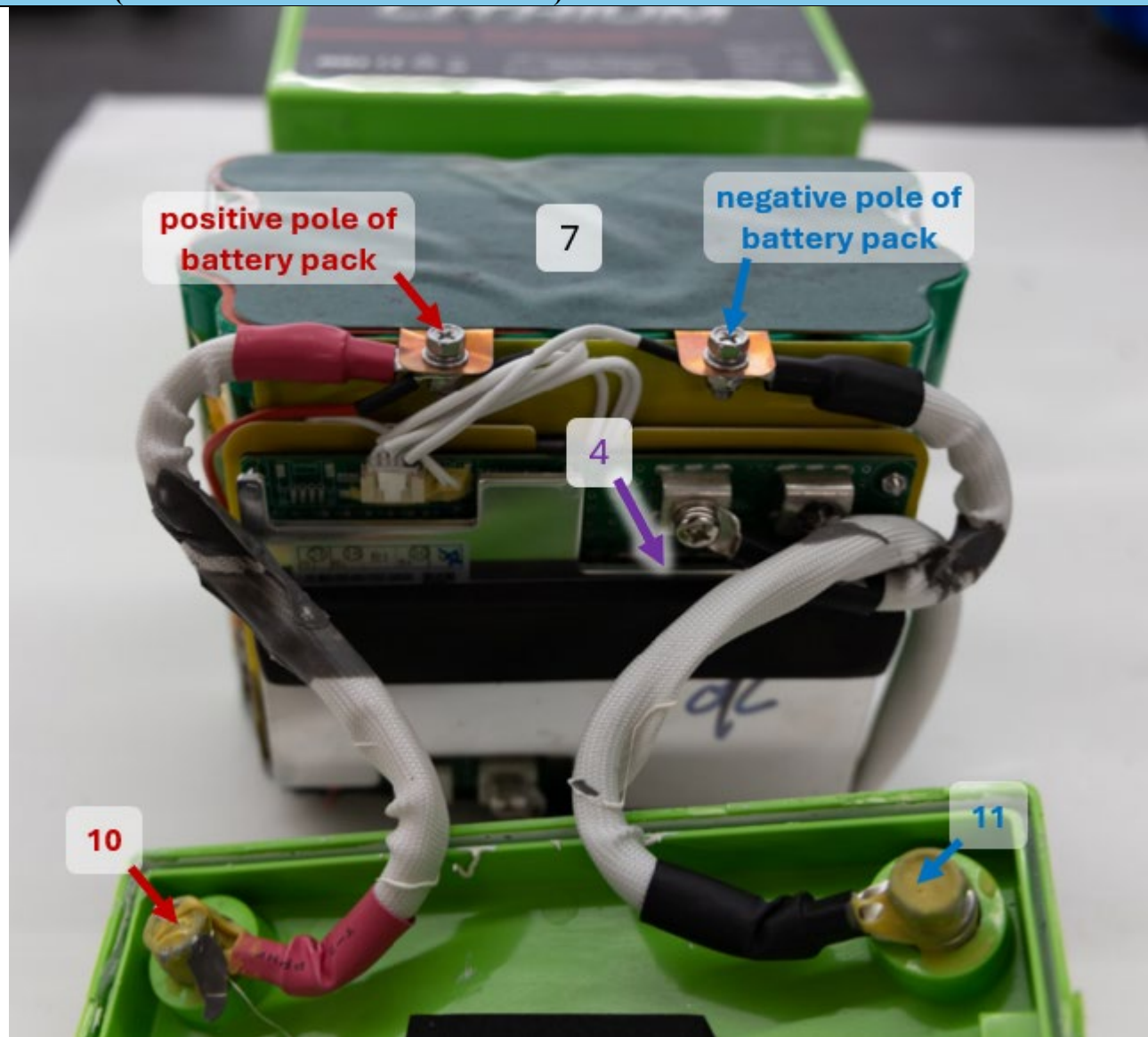
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div> <div> <div>HYG015N10NS1TA</div> <div>  </div> </div> <div> <div>N-Channel Enhancement Mode MOSFET</div> </div> <div> Feature <ul style="list-style-type: none"> • 100V/380A $R_{DS(on)}=1.2\text{ m}\Omega(\text{typ.})@V_{GS}=10\text{V}$ • 100% Avalanche Tested • Reliable and Rugged • Halogen-Free Devices Available (RoHS Compliant) </div> <div> Pin Description  </div> <div> Applications <ul style="list-style-type: none"> • Switching application • Power management for inverter systems • Battery management </div> <div>  </div> </div>
	<p>Huayi-HYG015N10NS1TA datasheet.pdf (annotated).</p> <p>The switches of a pair of solid state switches of the Tracker Lithium Gen2 12.8V 52AH are configured such that the drains of the switches are connected.</p>

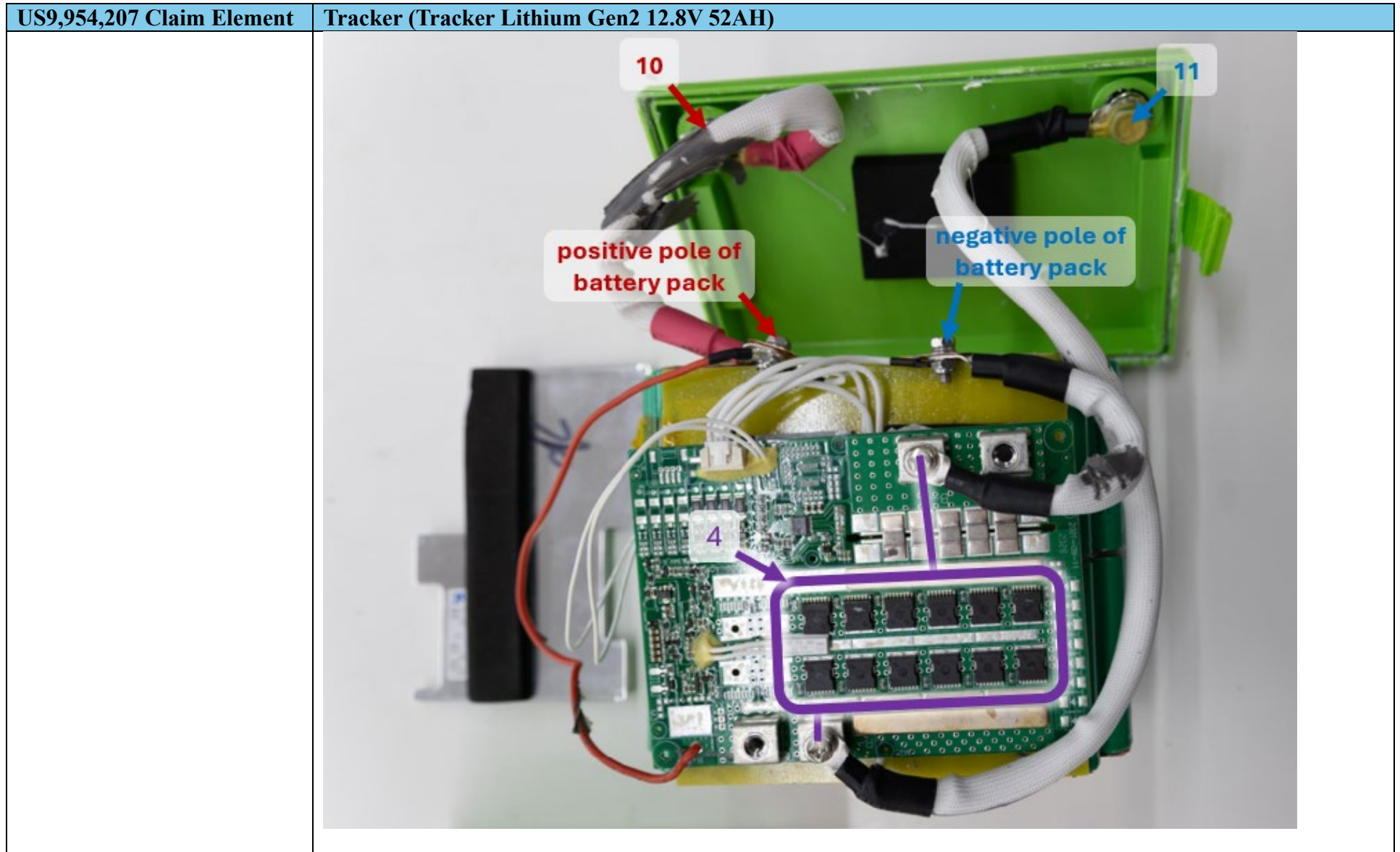
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	<div></div> <p>For example, as demonstrated by testing the electrical continuity using a multimeter, the drains of the switches of the Tracker Lithium Gen2 12.8V 52AH are connected, as shown by the nominal resistance measured between the drains of opposed MOSFETs.</p>

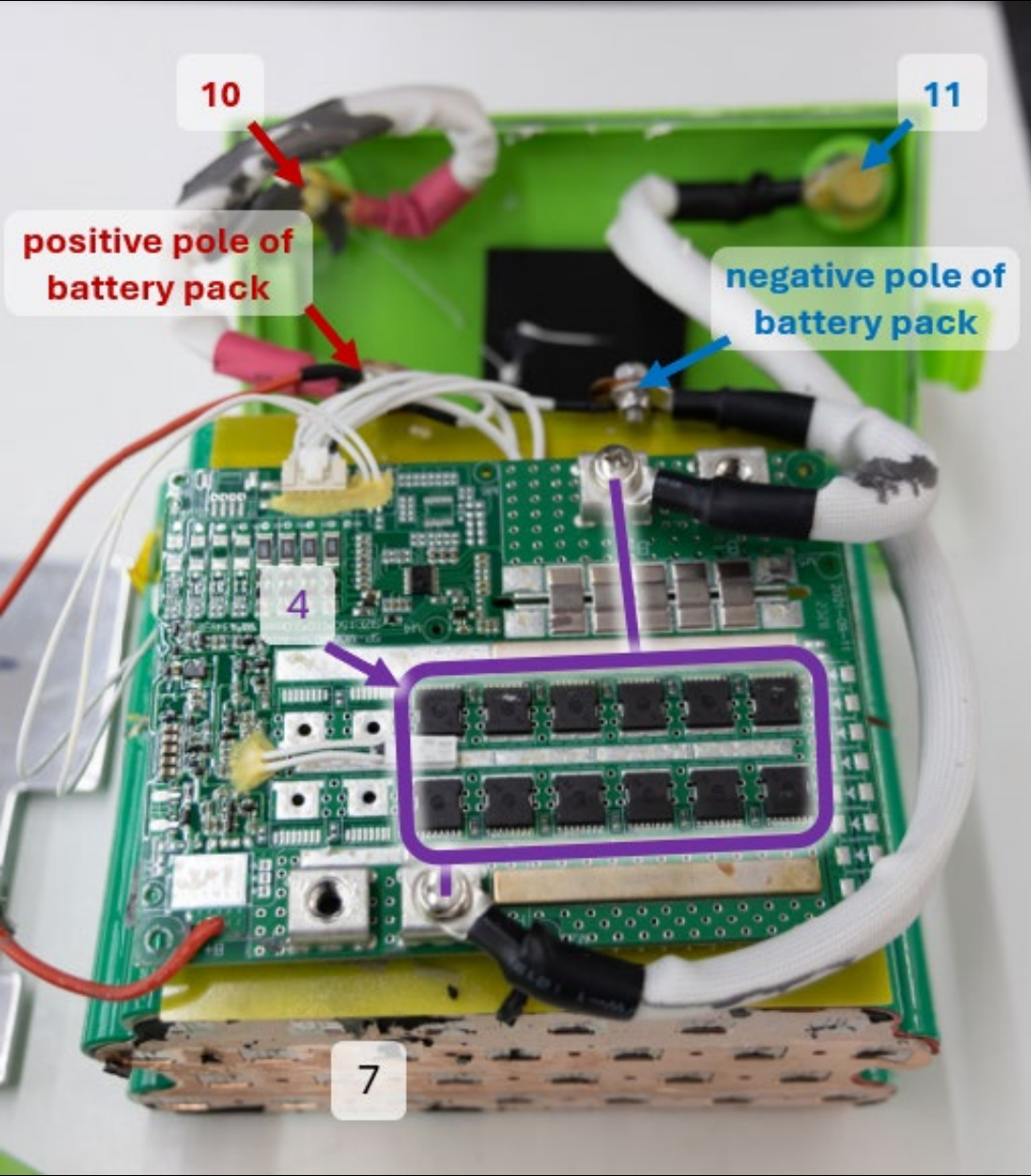
US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
<p>[12d-iii] said parallel configuration being connected with one or more cells between the positive and negative terminals,</p>	<p>The parallel configuration of solid state switches (4) of the Tracker Lithium Gen2 12.8V 52AH are connected with one or more cells (7) between the positive (10) and negative terminals (11).</p>

US9,954,207 Claim Element

Tracker (Tracker Lithium Gen2 12.8V 52AH)





US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
	
[12e]	The total discharging amount of each lithium-based cell in the Tracker Lithium Gen2 12.8V 52AH is from 3 Ah to 2000 Ah (e.g, 4.0Ah), and the charging voltage per one cell is from 2.0 to 4.2 V (e.g., 3.2V).

US9,954,207 Claim Element	Tracker (Tracker Lithium Gen2 12.8V 52AH)
<p>wherein a total discharging amount of each lithium-based cell in the battery pack is from 3 Ah to 2000 Ah, and charging voltage per one cell is 2.0 to 4.2 V.</p>	 <p>The image shows a Tracker Lithium Gen2 12.8V 52AH battery pack. The pack is green and black, with the brand name 'TRACKER LITHIUM' prominently displayed. It features a 'SUPER HIGH OUTPUT LITHIUM DEEP CYCLE BATTERY' label. The pack is composed of multiple green cylindrical cells. A close-up inset on the right shows a single cell with a red box highlighting the text '3.2V 4.0Ah'.</p>